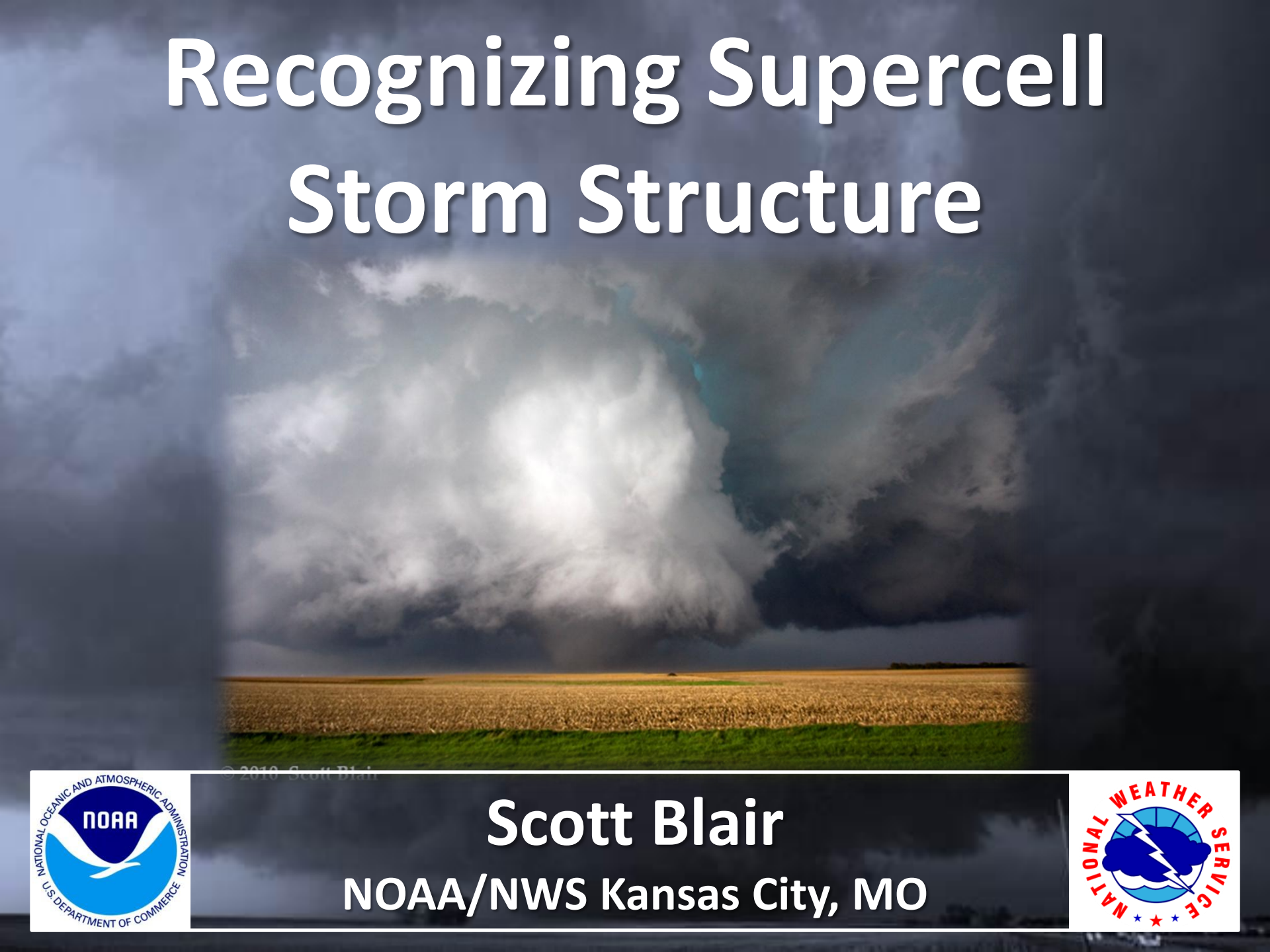
Recognizing Supercell Storm Structure

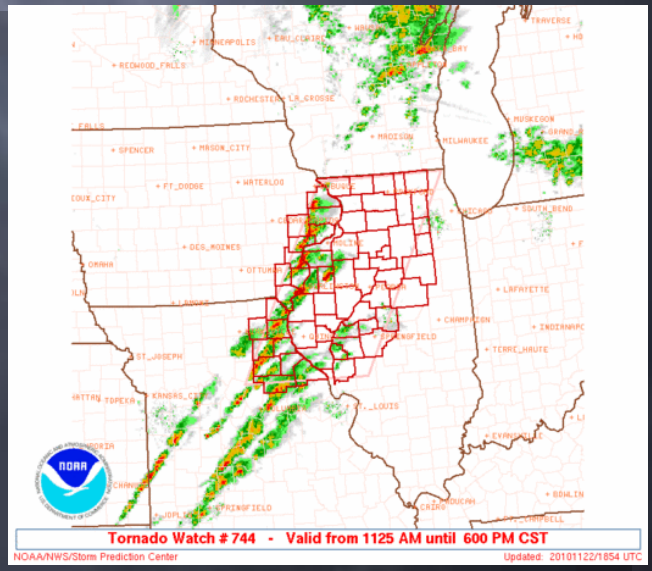


Scott Blair

NOAA/NWS Kansas City, MO

Why Supercells?

- All produce severe weather
- Most hail > 2” from supercells
- Responsible for most tornadoes



As a spotter:

- Important to be familiar supercell storm characteristics
- Quickly identify important parts of a storm
- Reading the sky (not just radar) critical for successful spotting

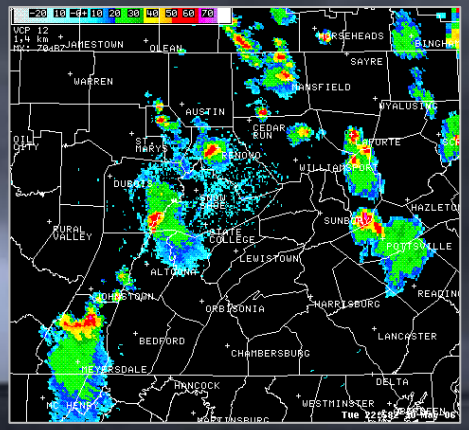
Objectives:

- Become familiar with supercell features
- How to read them and why they are important
- Supercell variations and evolution

Thunderstorm Spectrum

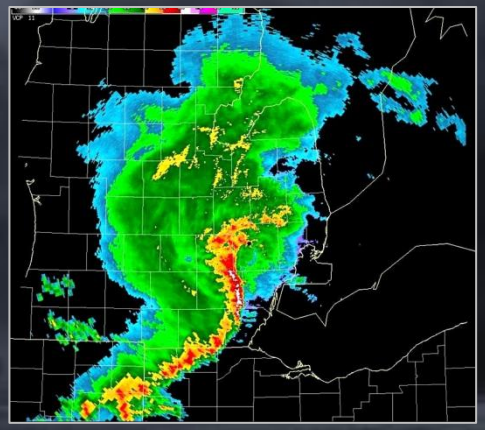
Single Cell

- Brief, weak updraft
- Microbursts, small hail
- Localized threat



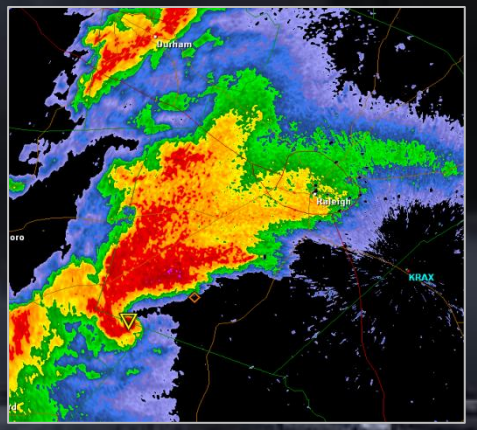
Multicell Cluster/Line

- Moderate updraft
- Severe wind, hail < 1.75”
- Medium threat

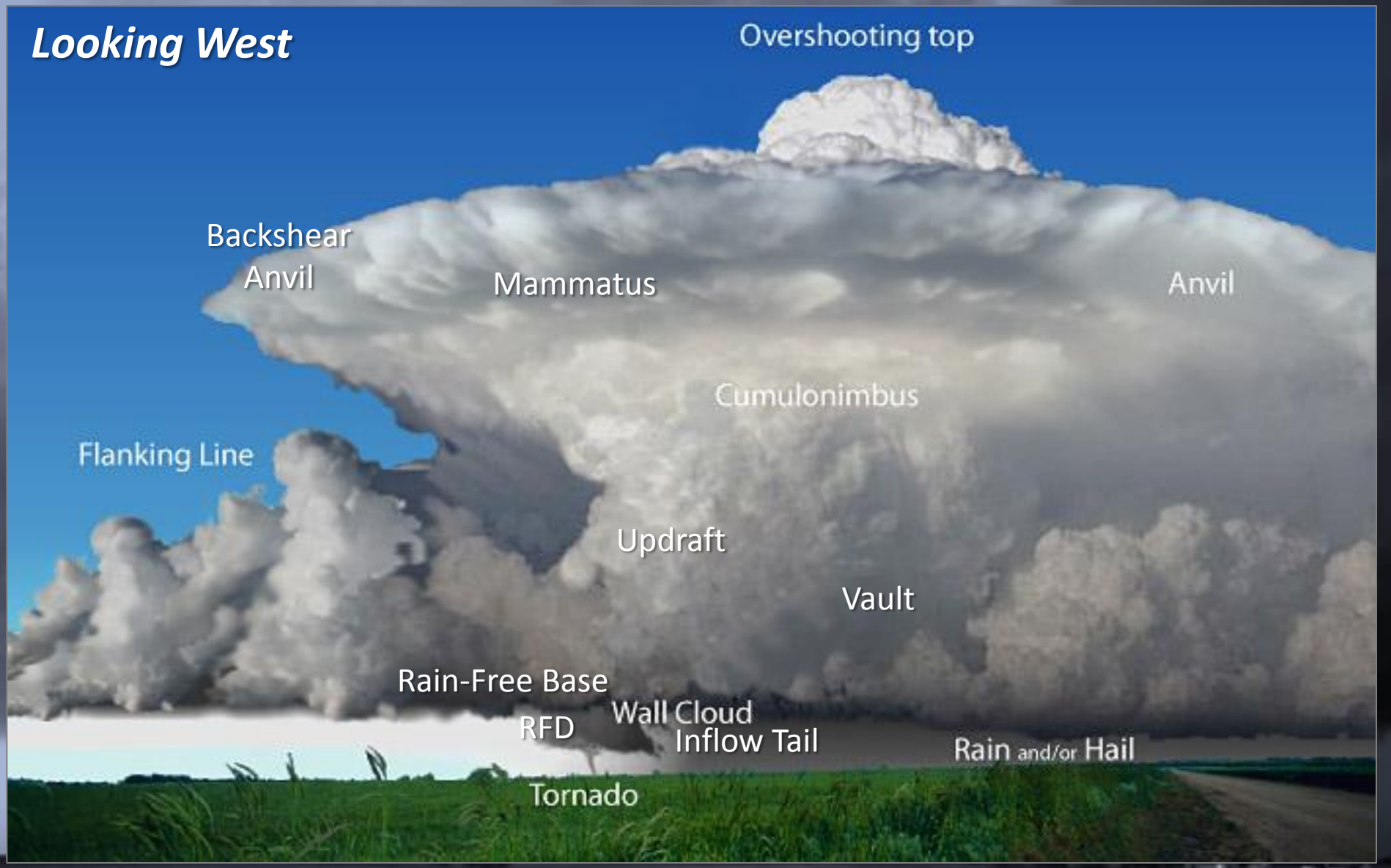


Supercell

- Intense updraft
- All severe weather types
- Significant threat

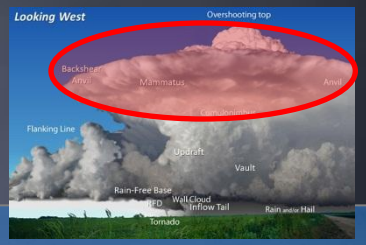


Parts of a Supercell



Convective Initiation

Anvil Cloud



Weak **Strong**

- Can gauge updraft strength by appearance
  Pulse-like, thin, solid, backsheared?
  - Watch for signs of change
  - Overshooting top present?

Mammatus Clouds

- Can form upstream or downstream from updraft
- Spectacular sight!

- Cloud protrusions hanging from the anvil cloud
- Not an indicator of severity

Convective Updraft

Weak **Strong**

- Primary mature storm updraft
- Visually gauge for updraft strength/health
- Best view behind the storm

(watch the edge of the updraft outline if out in front)

Convective Updraft

Flanking Line

- Towering cumulus leading to the main updraft
- Watch for subsequent, strong updrafts on the flanking line

Inflow Tail

- Inflow Tails are attached to main updraft base
- Watch cloud elements: Utilize them to highlight the “action area”
- Tails along the FFD may suggest general storm motion

Inflow Tail

Updraft Vault

- Vertical side of updraft, closest to precipitation
  - Might visually appear “clear”
- Region frequent for active lightning, giant hail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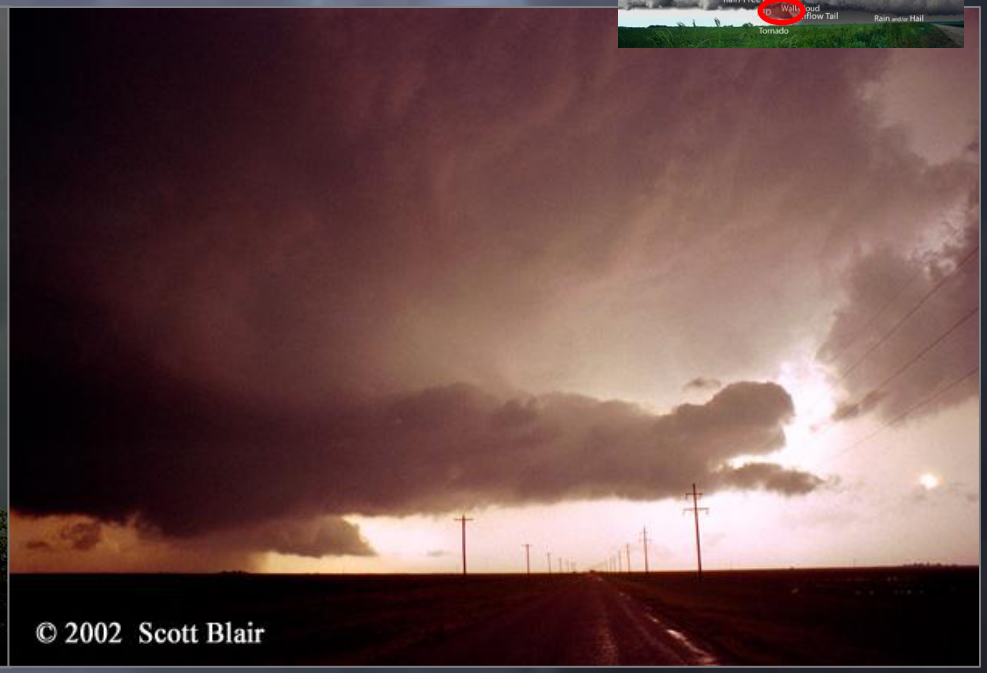
Rain-Free Base

- Identify the updraft-downdraft interface region
- Rain-free region under the main updraft base
- Focus on this region for tornadic potential

Rain-Free Base

- Low, medium-sized, flat rain-free base: watch for a lowering

Wall Cloud



- Attached, blocky extension from the main updraft base
  - Moves with storm, cyclonic rotation
  - Small in nature compared to storm
- Usual distinct slope towards FFD (think development)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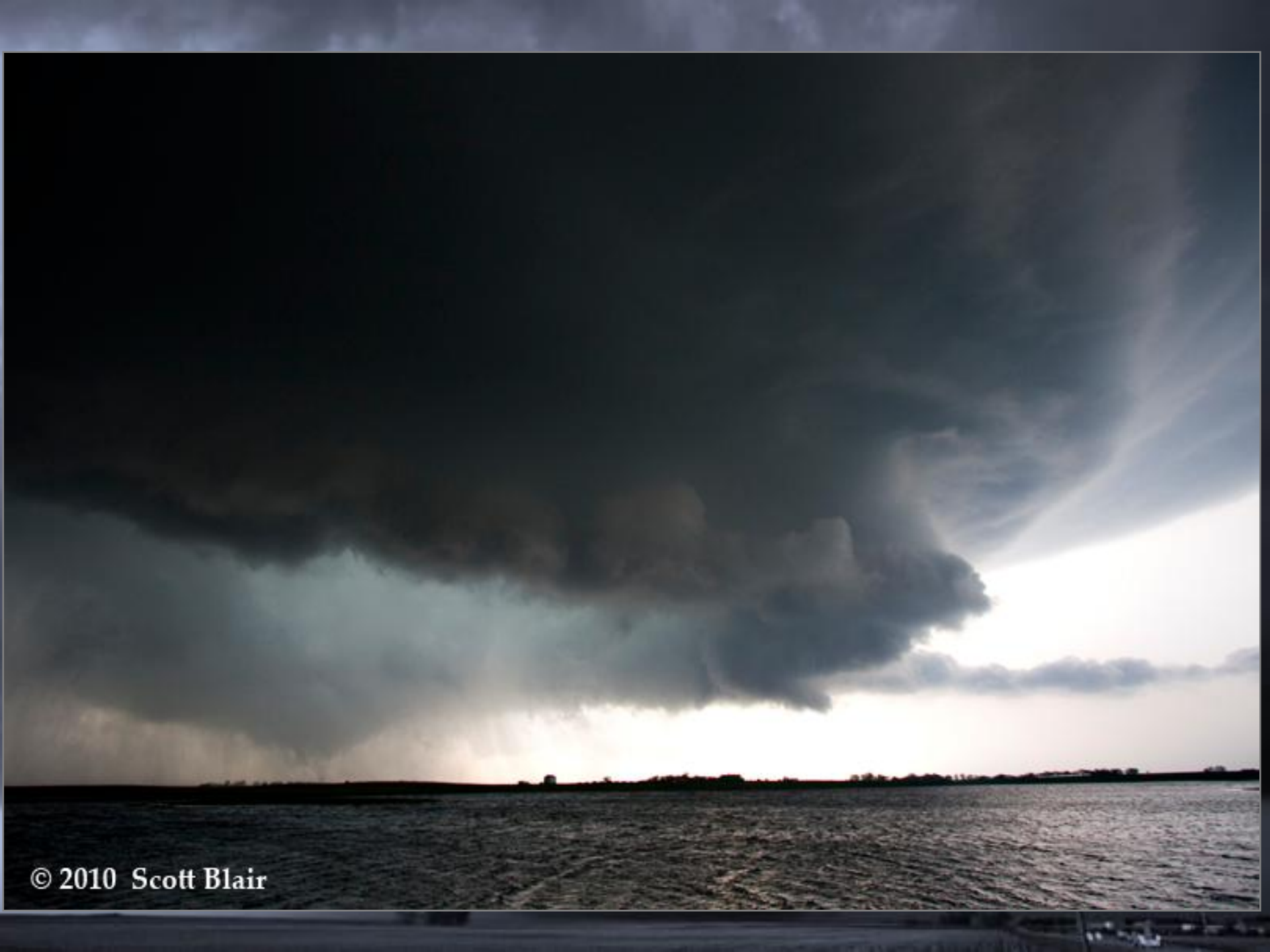
Rear-flank Downdraft

- Important visual precursor to tornadogenesis
- Watch for “clear-slot” to cut around wall cloud
- Cyclonic rotation may increase, wall cloud may contract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Tornado

Supercell Spectrum

Low-Precipitation (LP)

Classic

Wet-Classic

High-Precipitation (HP)

Low-Precipitation Supercell

- Reduced precipitation production
- Updrafts commonly small in size
- Very large hail threat from vault area
- Tornadoes not a frequent threat

High-Precipitation Supercell

- High precipitation production
- Rain/hail obscure most viewing angles
- Copious hail producers
- Dangerous (rain-wrapped tornadoes)

Wet-Classic Supercell

- Common supercell variation
- Base usually “wet”, but action area not fully obscured
- May transition to HP and back to wet-classic

Wet-Classic Supercell


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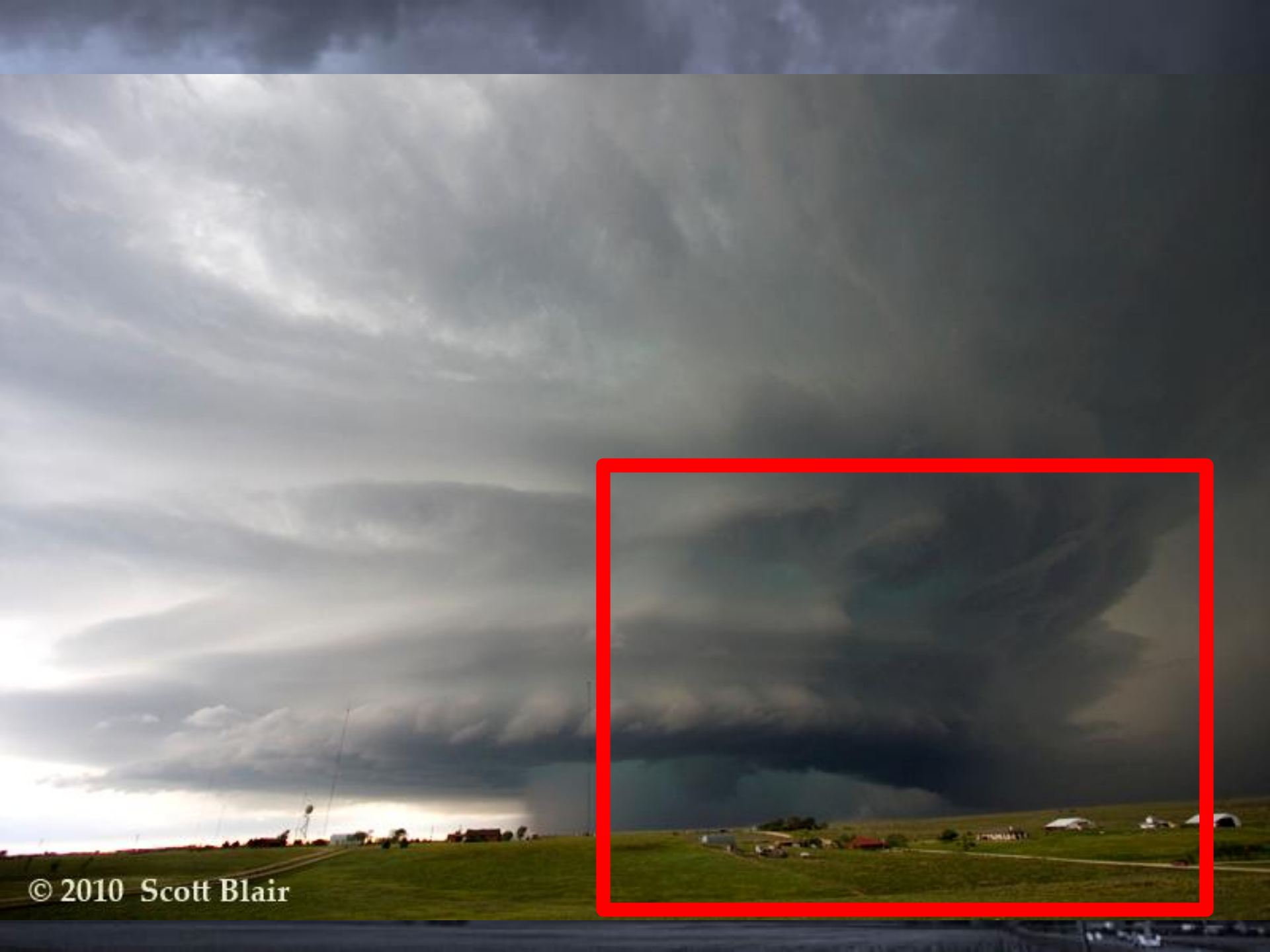
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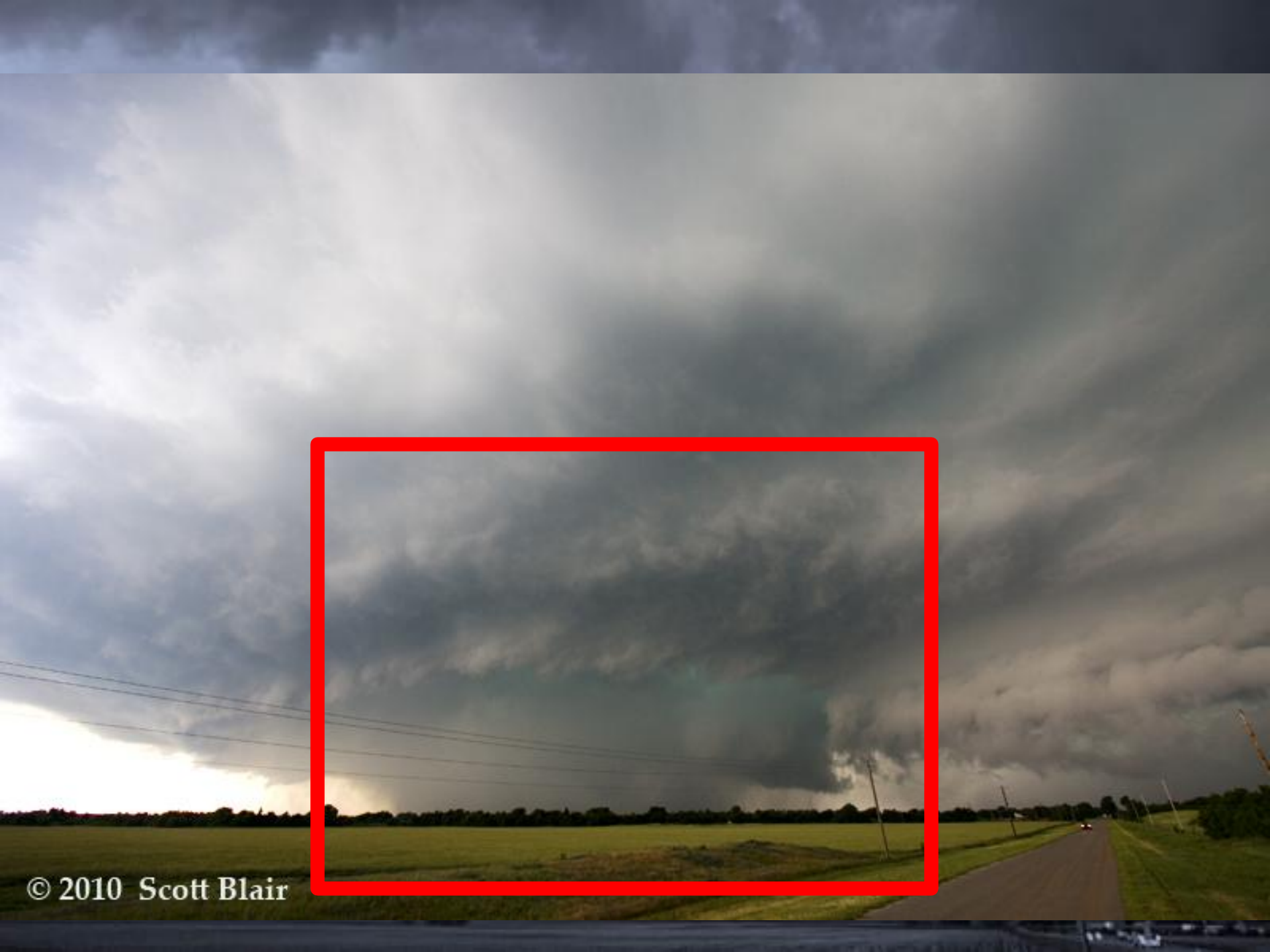
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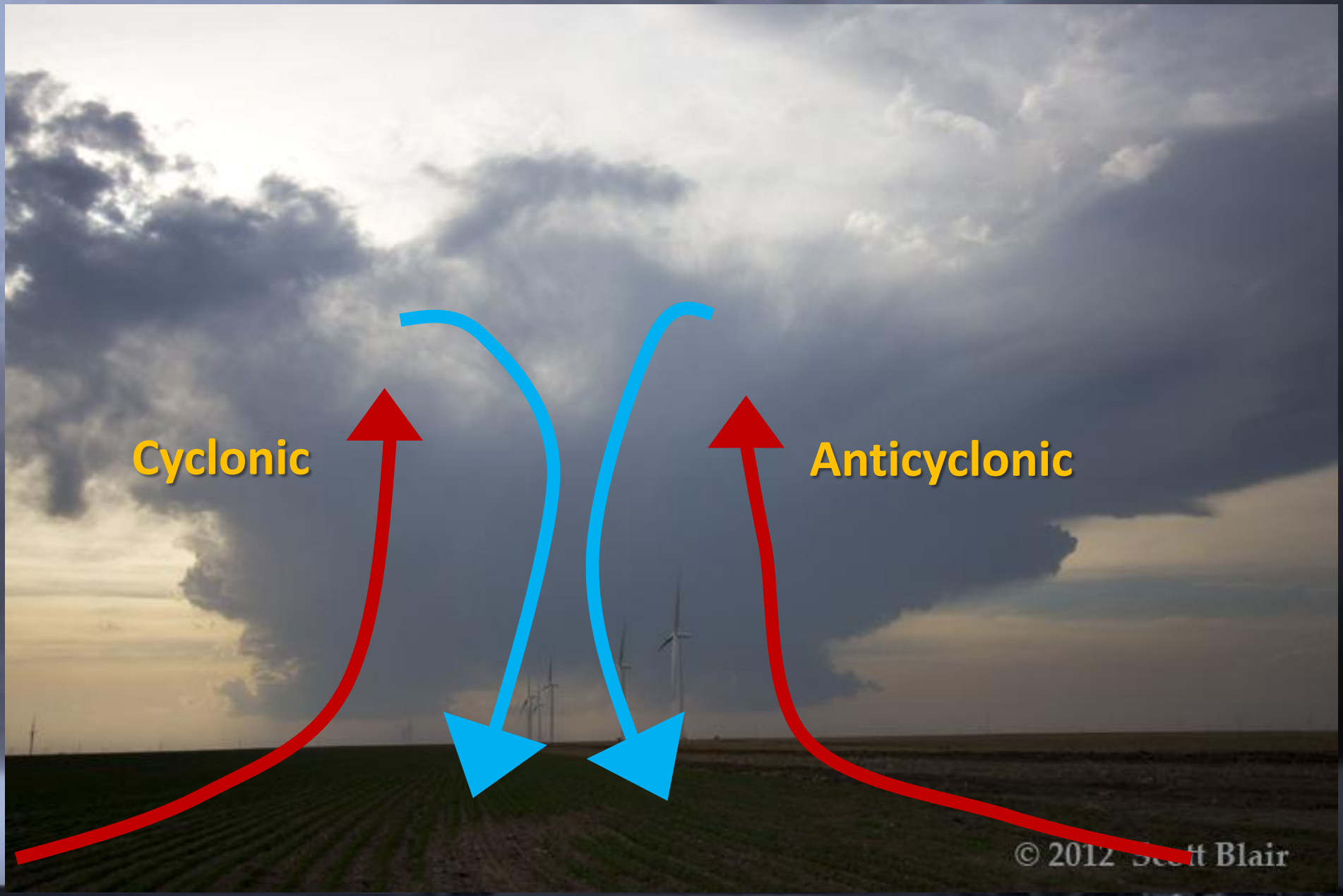
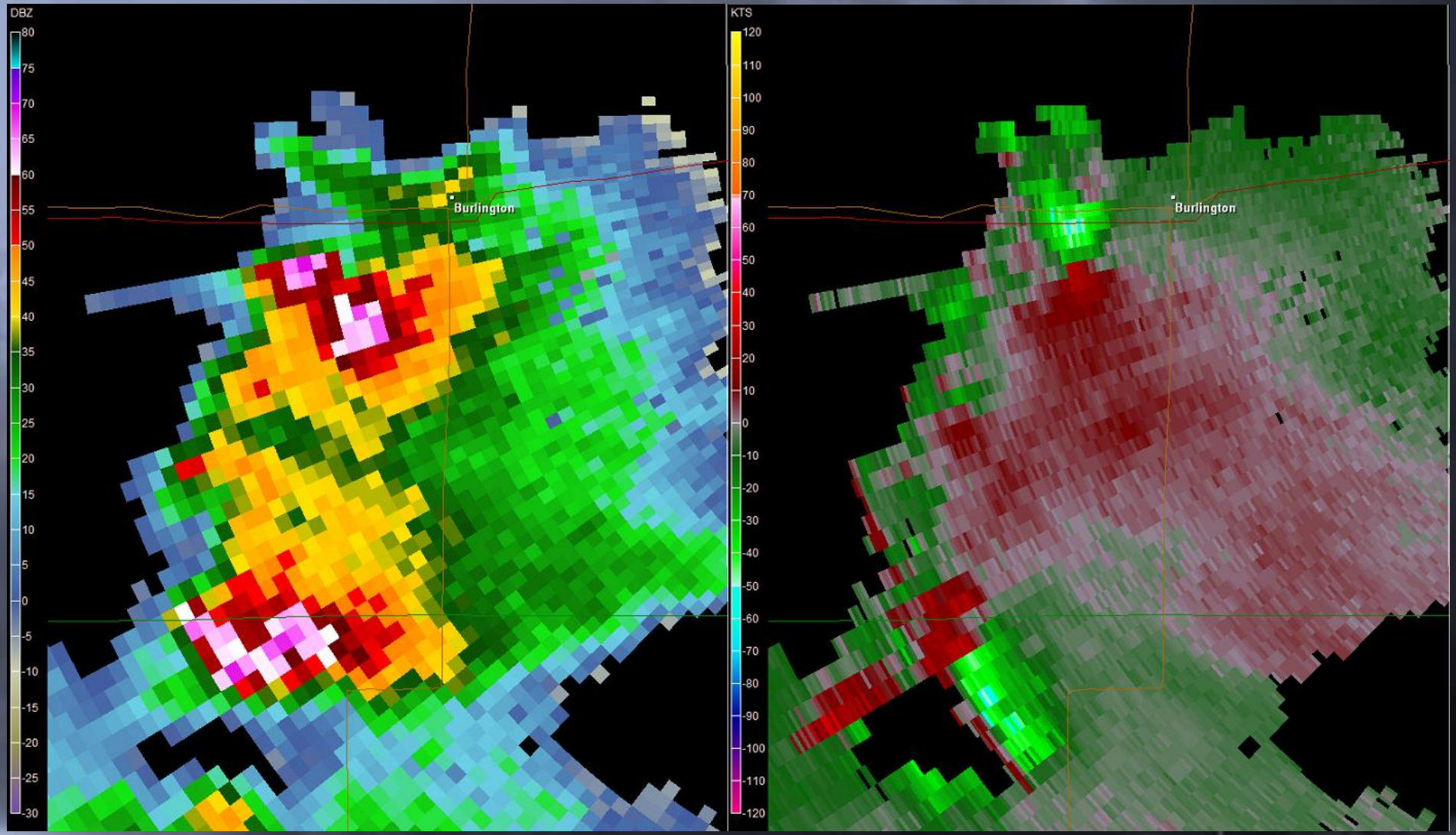
Splitting Supercells

Splitting Supercells

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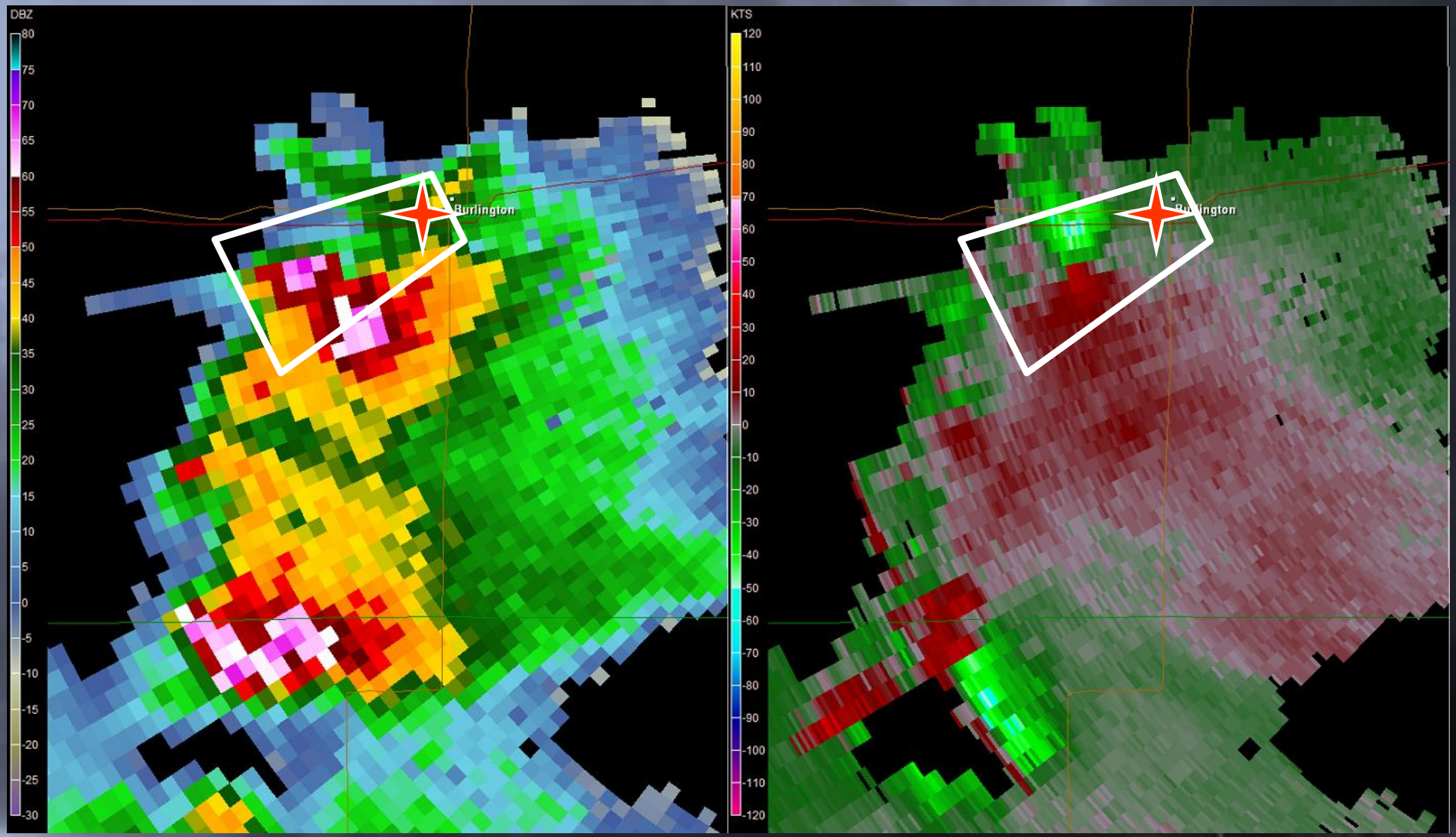
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